

# Blended Learning in Preclinical Medicine



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“Why get in front of class to tell them something they can read?”

*Rich Felder*



# Definitions

- Traditional approach (face-to-face)
- Blended learning (both electronic and face-to-face)
  - Use of digital resources (or e-learning) alongside traditional teaching
- Synchronous: F2F
- Asynchronous: self-directed and self-paced learning experience
- Teaching
- Learning
- Assessment



“CAL should not replace traditional education, but rather be used more as a supplement and for self-directed studies”

Seaward M. The Computer Age in Dentistry. Br Dent J 1981: 150: 55.



## Adult Learning

- Need to know why it's important
- Want to learn experimentally
- Approach as problem-solving
- Learn best when has immediate value



The joy of learning

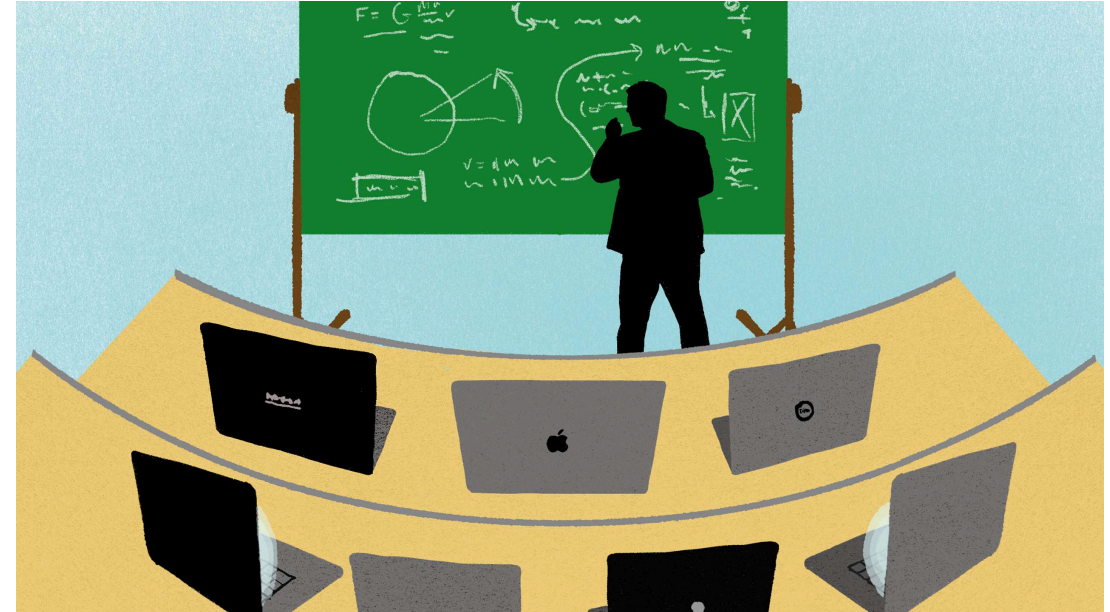
# Constraints in Preclinical Medical Education

- Time and COVID
- Medical students, as adult learners, are open to new methods of learning
- Encourage students to be active rather than passive learners
- Challenge is to adopt new teaching methods, while maintaining excellence in medical education

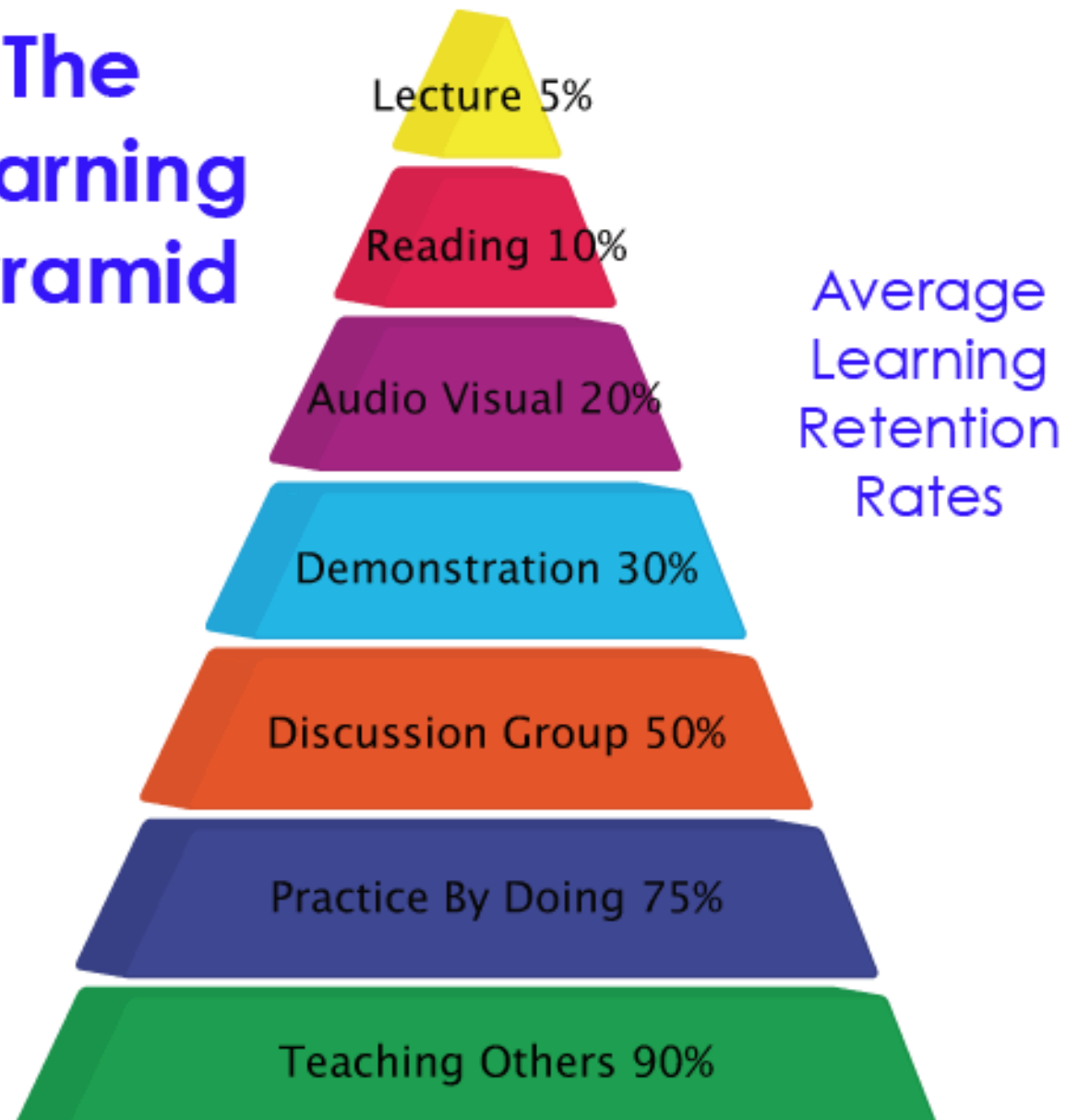


# Going from Sage on Stage to Guide by the Side

- From lecturer to learning facilitator
- Efficient and effective use of technology requires an understanding of advantages and inherent limitations
- Originally promoted to save costs and increase efficiency



# The Learning Pyramid



Average Learning Retention Rates

Adapted from NTL Institute for Applied Behavioral Science

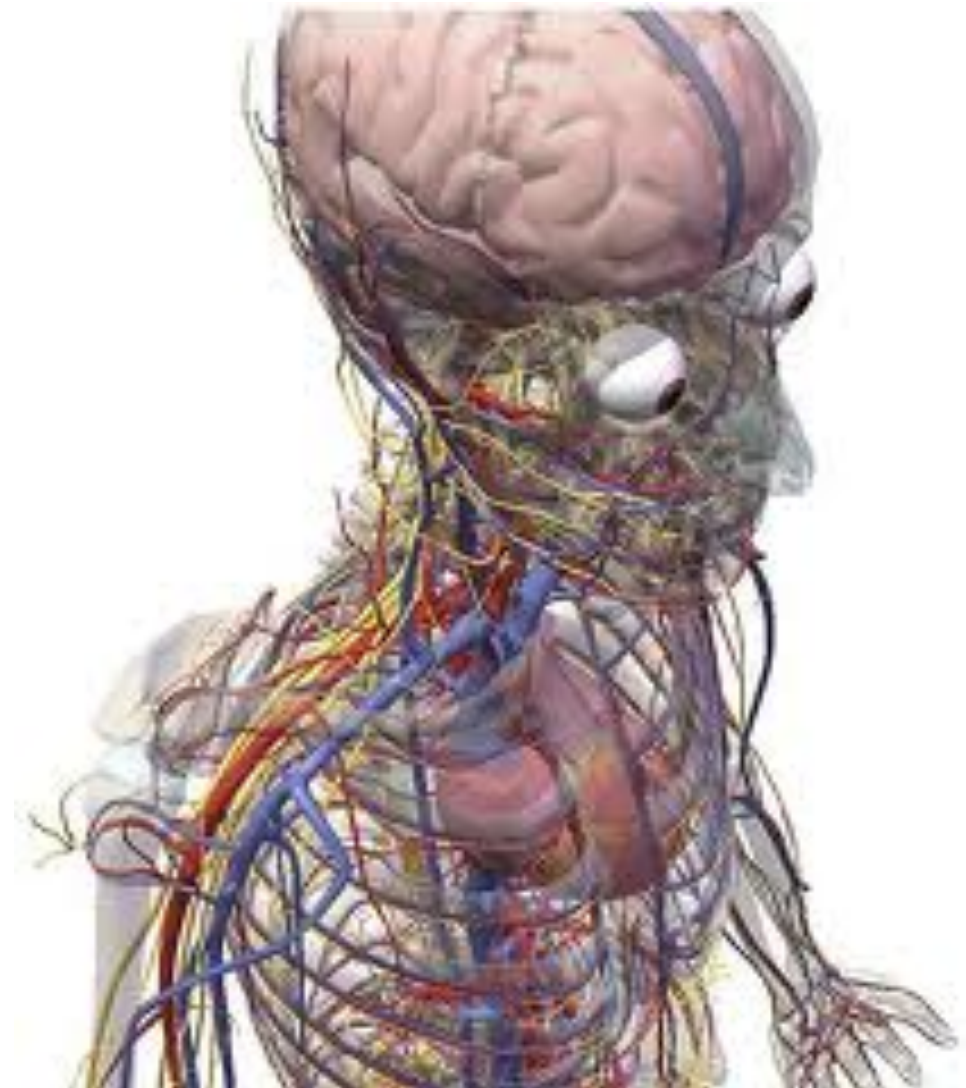


# One Possible Blended Learning Approach

- Acquire basic knowledge
  - Attend relevant lectures
  - Use textbooks and self-directed learning modules
- Preview relevant cases with clinical questions and learning objectives
- Reinforce basic knowledge in weekly case-directed anatomy sessions
  - Interactive discussion of clinical cases
  - Dissection sessions where students rotate around stations viewing prosected cadavers and imaging
  - Practice relevant clinical skills on each other in small bubbles

# Accessible & Interactive Educational Tools for Self-paced Learning

- High student satisfaction: seen as complementary to traditional instructor-led training
- Can be delivered at any time/place and can be tailored to individual learning needs
- Can enhance learning, dissemination, creation of learners' communities and networking
- Can be applied to visual, audio, and kinesthetic learners
- May be used in flipped classroom setting



# Other Advantages

- May include self-assessment tools for interactive feedback on performance
- Particularly suited to subjects that are visually intensive, detail oriented, and difficult to conceptualise, e.g., complex biochemical processes or microscopic images
- Personalised learning—Each learner can progress at own preferred pace and can repeat, interrupt, and resume
- May be particularly valuable for weaker students



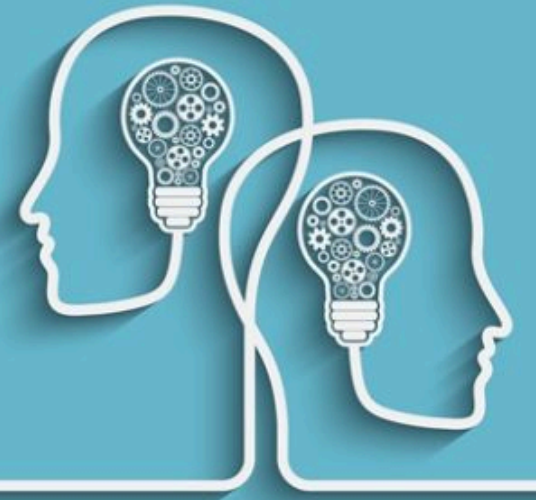
# Requirements

- Electronic course management system ideally with options for video conferencing, discussion board and e-mail
- Training for both students and teaching staff
- Willingness to engage by senior management

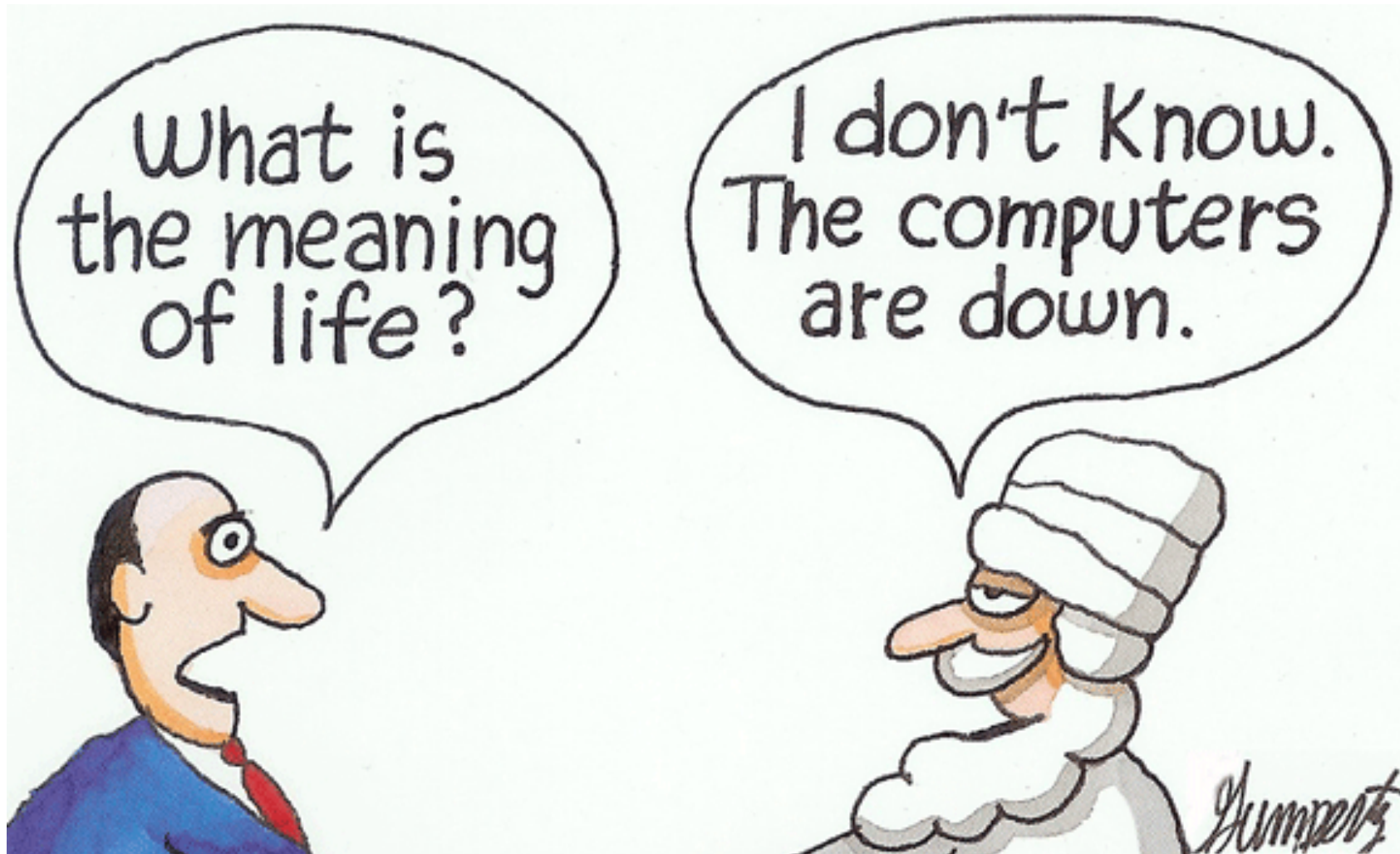


# Disadvantages

- Bandwidth
- Time consuming for tutors to engage in online discussions
- Requires a cultural change in learning practice that might not be easy for everyone
- Copyright protection—Agreed university policy on intellectual property rights
- Frustration and time wasting due to technical glitches, “dead” hypertext links, poorly coordinated real-time seminars, and ambiguous instructions



Technological innovations are welcomed by students but cannot entirely replace hands-on sessions and lectures



# Challenges

- Embedding new ways of work when institutions are resistant to change
- Resistance to change mostly from the underlying values, ways of thinking, management styles of the organisation
- Creating readiness for change
- Energising commitment
- Developing political support
- Managing the transition
- Sustaining momentum



# From the Student Perspective

- Uncertainty and anxiety about personal safety and continuity of learning experience
- Some students = “lose themselves” and some “find themselves” in the virtual environment
- Some students perceive their virtual seminar group as part of a warm, friendly, and supportive online community, others perceive themselves facing a whole sea of strangers





# Stages of Competence in Online Learning

- **Level 1—Gaining access.** Is able to log on and motivated to continue; posts first “joining” message when instructed
- **Level 2—Becoming familiar with the online environment.** Basic technical skills & confident in sending and receiving messages
- **Level 3—Seeking and giving information.** Confident in using all features. Freely offers, receives, and processes information from others on line
- **Level 4—Knowledge construction.** Online activity leads to knowledge construction (asks challenging questions, reflects, suggests ideas) and interactive thinking (critique, summarise based on ideas)
- **Level 5—Autonomy and development.** Takes responsibility for own online learning. Is able to set up and support own virtual group

# Curricular Process

- Decide beforehand which parts of the curriculum are to be delivered F2F versus e-learning
- Balance between F2F education and e-learning is delicate
  - Consider learning outcomes, student level, electronic resources and the trainer's experience
- Consider range of the students' computer skills
  - Prevent students who lack computer skills from becoming disadvantaged or frustrated
  - Continuous student feedback
- Once basic format agreed and initial materials prepared, updates can be maintained by more junior members



# Curricular Process

- Invest in staff development
- Provide a central resource base
- Avoid reinventing the wheel: become part of wider networks that are already sharing and working collaboratively
- Use different methods that can be modified, upgraded, and integrated with traditional teaching material
- Offer appropriate incentives for staff who become active members of the virtual campus e.g., include in criteria for promotion



# Practical Issues re F2F Teaching & Assessment

- Lectures and CTS live zoom and recorded
- Students in bubbles of 4 for dissections and clinical skills
- Organised timetable to minimise campus visits
- Spacing in corridors
- Keep books/computers etc to a minimum
- Contact tracing app
- Anatomy spotter tests can be online

# Challenges of Online Assessment

- Flexibility ? limited to MCQ and T&F, e-correction
  - SAQs w case studies can be scanned & emailed (free CamScanner)
- Limited student experience
  - Practice regularly & encourage student self-reflection
- Technical issues: limited internet and/or ICT access
- Cheating in written and oral e-exams
- Student stress especially if slow typing speeds interfere with time management
- Student trust in the exam must be earned



# How to Minimise Cheating

- Higher Bloom's taxonomy questions
- Multiple sets of questions at same level of difficulty
- Shuffle questions
- Significantly limit exam time
- Webcam/ live streaming (zoom supervision)
  - Requires many proctors
- Use open book questions, analytic questions
- Use lockdown browser software
- Use Turn-it-in to check for plagiarism
- Use random oral exams



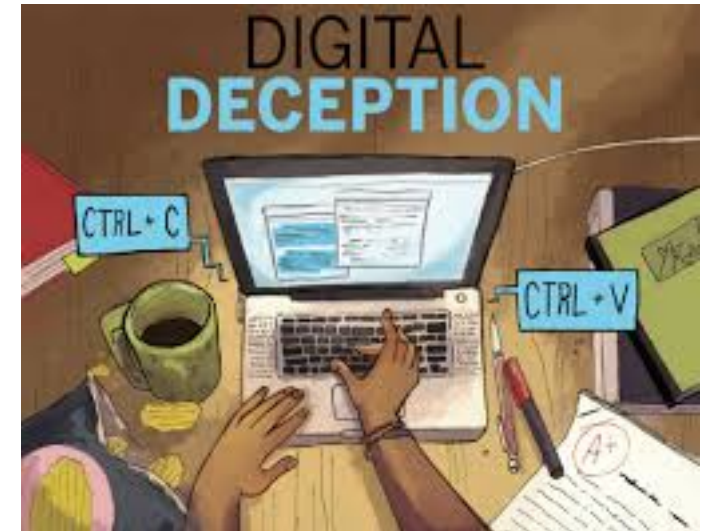
# Bloom's Taxonomy in Anatomical Assessment

- **Remembering:** Name the attachment of the flexor retinaculum.
- **Understanding:** Explain in anatomical terms why sensation over the palm of the hand is intact in CTS.
- **Applying:** What questions can you ask to distinguish between a median nerve injury at the elbow and wrist?
- **Analysing:** In what ways do the claw hand in a median nerve and ulnar nerve lesion differ?
- **Evaluating:** What are the consequences of a fracture of the neck of the humerus?
- **Creating:** What tools could be used to evaluate the severity of a brachial plexus injury?



# Addressing Technical Issues

- Assess students' technical requirements & knowledge
- Pre-exam workshops & video clips
- Pilot exams are a must
- Rapid, responsive communication during exam if issues arise
- Use software with cloud backup to handle disconnection during exam
- Use software which works with minimum internet requirements (e.g Edmodo)
- Select exam time when faster connection available





# Blended Learning: Conclusion

- Transforms the role of the teacher from disseminator of knowledge to facilitator
- Allows collaborative learning & asynchronous communication
- Facilitates flexible, learner-centred teaching
- Permits greater flexibility and responsiveness in teaching and learning
- Overcomes restrictions of time and place
- Includes teaching methods that are hard to achieve with textbooks alone without increasing resources
- Convenient and flexible without geographic constraints
- Students gain persistence, adaptability, resilience, grit, and tolerance for uncertainty

The medical school of the future may be one that can successfully offer (in collaboration with other educational providers) a flexible menu of both F2F and self study modules from which individual students can select to meet their own unique requirements. Any other option, including staying as we are, may ultimately prove unaffordable.



Questions?

